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अपघर्षी बृहत कण—स्थूल घनत्व ज्ञात करना

Indian Standard

ABRASIVE MACROGRAINS—DETERMINATION OF BULK DENSITY

ICS 25.100.70

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 2003 **Price Group 2**

Abrasives Sectional Committee, BP 09

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 9136:1989 'Abrasive macrograins — Determination of bulk density' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Abrasives Sectional Committee and approval of the Basic and Production Engineering Division Council.

The text of the ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 6344-1:1998 Coated abrasives — Grain size analysis — Part 1: Definitions, designation and principle	IS 15287 (Part 1) : 2003 Coated abrasives — Grain size analysis: Part 1 Grain size distribution test	Identical
ISO 8486-1 : 1996 Bonded abrasives — Determination and designation of grain size distribution — Part 1: Macrogrits F 4 to F 220	IS 15288 (Part 1) : 2003 Bonded abrasives — Determination and designation of grain size distribution: Part 1 Macrogrits F 4 to F 220	do

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

IS 15289 : 2003
ISO 9136 : 1989

Indian Standard

ABRASIVE MACROGRAINS—DETERMINATION OF BULK DENSITY

1 Scope

This International Standard specifies a test method for the determination of the bulk density of bonded and coated abrasive macrograins.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6344-1:—[1], *Coated abrasives — Grain size analysis — Part 1: Definitions, designation and principle.*

ISO 8486:1986, *Bonded abrasives — Grain size analysis — Designation and determination of grain size distribution of macrogrits F4 to F220.*

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6344-1 and ISO 8486 and the following definition apply.

bulk density of abrasive macrograins: Mass of a given volume of the abrasive grains, expressed in grams per cubic centimetre (g/cm^3).

4 Apparatus

The test apparatus is illustrated in figure 1. It consists of the following elements.

4.1 Stand

An exact description of the stand is not necessary. The only requirement is that it is capable of holding the funnel in a vertical position so that the bottom of the funnel is 76 mm ± 1 mm above the top of the measuring cylinder.

4.2 Funnel

The slope of the funnel shall be such that fine grains will not adhere to the sides. By preference, the funnel shall be made of stainless steel with smooth inside seams. Its dimensional characteristics (see also figure 1) shall be as follows:

- total height of funnel: 240 mm
- diameter of top: 160 mm
- inside diameter of the cylindrical outlet: 20 mm ± 0,5 mm
- height of the cylindrical outlet area: 40 mm ± 1 mm

4.3 Funnel release valve

An exact description of the funnel release valve is not necessary. The only requirement is that quick opening of the valve is ensured. Figure 1 illustrates a swinging stopper release valve as an example.

4.4 Measuring cylinder

The volume of the measuring cylinder shall be approximately 200 cm^3 and its internal diameter shall be 64 mm. This results in an internal height of 62 mm. The exact volume of the measuring cylinder shall be determined in accordance with clause 5.

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[1] To be published.

4.5 Overspill dish

The measuring cylinder is placed in an overspill dish for collecting the excess abrasive grain.

5 Calibration of the measuring cylinder

Prior to use, determine the volume of the measuring cylinder as follows.

Weigh the dry empty cylinder together with a flat glass plate (slicker plate).

Fill the cylinder with water and slide the slicker plate into contact with the upper edge of the cylinder, cutting off the water precisely in the plane of the upper edge.

With the glass plate held firmly in place, wipe off the excess water and determine the gross mass.

Calculate the volume of the cylinder as follows:

$$V = \frac{m_0}{\rho_{H_2O}}$$

where

V is the volume of the measuring cylinder, in cubic centimetres;

m_0 is the mass of water, in grams;

ρ_{H_2O} is the mass density of water at the temperature range considered, in grams per cubic centimetre.

6 Method of measurement

6.1 Preparation of samples

For grain sizes F100 or P100 and finer, dry the abrasive grain at a temperature of 110 °C for 1 h and then, prior to measurement, cool them to room temperature.

Coarser grains shall also be dried and then cooled to room temperature.

6.2 Procedure

Fill a 250 ml beaker to the top with the abrasive grain to be tested. With the funnel outlet closed and the measuring cylinder centred under the outlet of the funnel, pour the grain into the funnel. Open the outlet of the funnel and allow the grain to fall freely until the funnel is empty. Avoid vibrations throughout this procedure.

Strike off the excess grain from the measuring cylinder using a straightedge, making four movements perpendicular to each other. This operation prevents compaction of the abrasive grain in the cylinder. Avoid vibrations or other shocks. Weigh the grains contained in the measuring cylinder.

7 Expression of results

7.1 Method of calculation

Calculate the bulk density as follows:

$$\rho_{ap} = \frac{m_1}{V}$$

where

ρ_{ap} is the bulk density, in grams per cubic centimetre;

m_1 is the mass of grains contained in the measuring cylinder, in grams;

V is the volume of the cylinder, in cubic centimetres.

7.2 Repeatability

The results of duplicate determinations carried out by the same operator using the same apparatus shall not differ by more than $\pm$ 0,02 g/cm^3.

Dimensions in millimetres

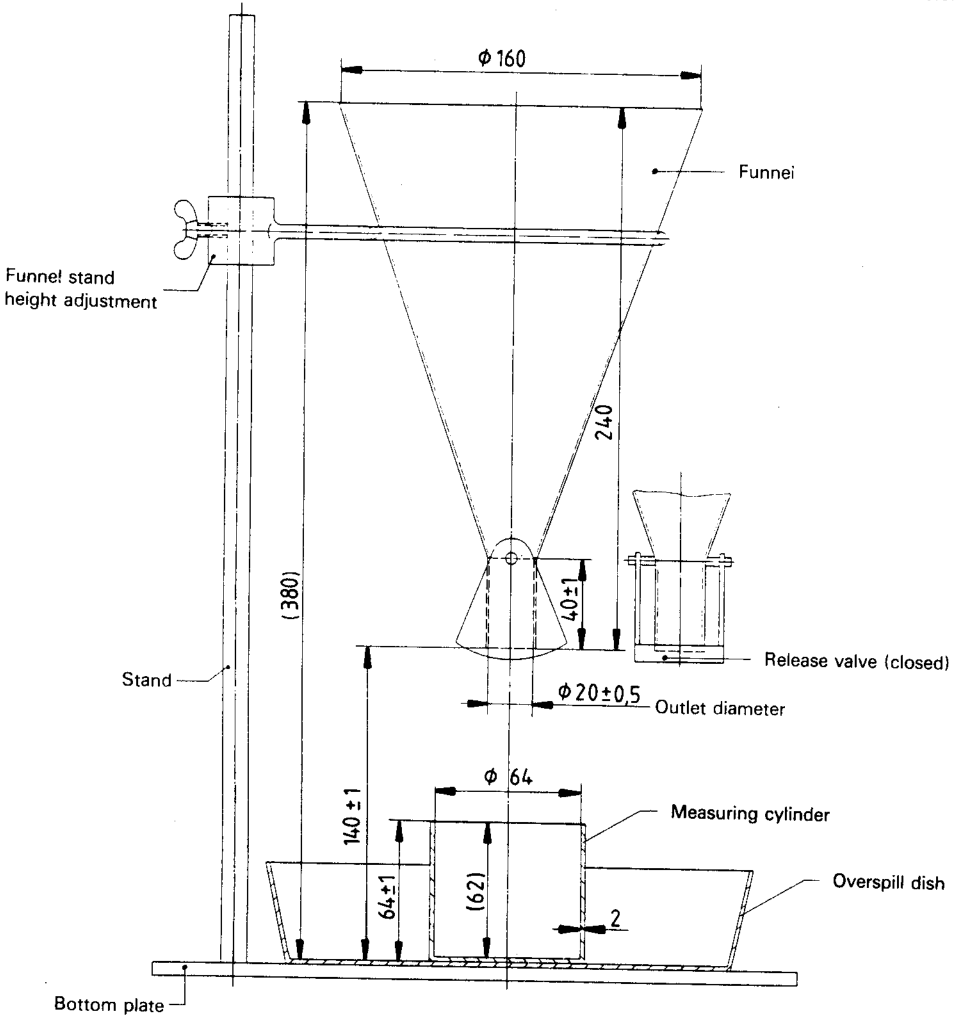

Figure 1 — Apparatus for the determination of the bulk density of abrasive macrograins

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